
ENVIRONMENTAL Fact Sheet



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Implementing a Water Efficiency and Conservation Program for Public Water Utilities

The goal of an effective water demand management program should be to allow water users to maintain the benefits of their water needs, while at the same time not causing damage to the environment or jeopardizing the sustainability of water to other existing or future users. Traditionally, water utilities have focused on developing additional supplies to satisfy increasing demands associated with population growth and economic development. Increasingly, however, water utilities throughout New Hampshire are recognizing that water conservation programs can reduce current and future water demands to benefit the customer, the utility, and the environment.

This fact sheet describes how a water utility can manage the demand of water from its customers through the implementation of water efficiency practices.

Why A Utility Would Want To Promote Water Conservation

Water conservation efforts are spurred by a number of factors that include:

1. Growing competition for limited water supplies and increasing concerns regarding impacts of water withdrawals on stream flows, wetlands and other groundwater users.
2. Increasing costs and difficulties in developing new supplies.
3. Increased demand on water supplies resulting in optimization of existing facilities and infrastructure.
4. Ability to delay or reduce capital investments in capacity expansion of a water system.
5. Growing public support for the conservation of limited natural resources and overall protection of the environment.

Although conservation is sometimes an alternative to developing additional supplies, it is more often one of several complementary supply strategies for a utility. A conservation strategy, like any supply strategy, is part of a utility's overall integrated resource planning to ensure that all important community objectives and environmental goals are considered.

Water Conservation Approaches

A fundamental requirement for the implementation of a water conservation program is to obtain detailed knowledge that describes how customers currently use water and to assess how the water utility tracks and maintains its system. This information is considered to be baseline data with which a water utility can assess the types of water conservation opportunities that exist and characterize the public's existing water conservation behaviors and attitudes so that a water

conservation program can be developed and implemented. System conservation plans should identify opportunities to manage water demand, establish water conservation priorities and goals, and identify responsible parties.

Accurately understanding the real opportunities for conserving water upfront is important if conserved water is going to be considered a reliable water source by a utility. The reliability of conserved water depends on accurate estimates of potential savings, expected benefits, and costs. Therefore, careful analysis and planning is a prerequisite to major utility investments in conservation programs. Reliability concerns also underscore the need for utilities to monitor and document the effectiveness of their conservation programs. The development and execution of a conservation program will more likely be successful if a utility designates a person or an office as one clearly defined source for the coordination and implementation of conservation activities.

There are a number of ways in which water efficiency may be encouraged by a water utility. These methods include:

- Public education, outreach, and technical assistance.
- Water fixture retrofitting and replacement.
- System metering and improvements.
- Water conservation incentives through rate structuring.
- Coordination with local elected officials to develop ordinances relating to outdoor landscape construction and water use restrictions.

These water efficiency approaches are described below.

Public Education, Outreach, And Technical Assistance

An educational or outreach program should demonstrate to water consumers that investments in water use efficiency and conservation will provide water users with long term savings by enabling a utility to avoid having to develop and treat new water supply sources and develop wastewater treatment facilities. Also, the utility should highlight the environmental benefits of reducing water demands. Education programs should inform consumers about the relationship between groundwater and surface water and the potential impacts of withdrawals on instream uses, such as habitats for fisheries and other wildlife and water-based recreation. The focus of a water conservation program may initially target the largest water users, user groups, or the users with the greatest opportunity for water use reduction to quickly achieve the greatest potential savings. The benefits of a conservation program will then become rapidly noticeable. Public outreach and education can be approached in a number of ways and can include variations of the following programs:

- *Development of a conservation information and customer support center* - These centers can potentially be established and publicized in cooperation with another type of utility. They can act as a clearinghouse to distribute water efficiency information and materials.
- *Development of a public advertising campaign* - A public advertising campaign can be conducted that includes descriptions of water efficiency success stories. The New England Water Works Association has a "Super Water Saver Kit" available for a small cost that includes professionally prepared public information articles, public service announcements and camera ready ads (contact Melissa Fortin at (508) 478-6996).
- *Support or initiate water efficiency education programs in area schools*- If local schools do not presently have a conservation education program, offer to sponsor one and supply them with fliers, speakers and other information. An example of an education program that includes conservation is Project WET, Water Education for Teachers. Project WET

is an interdisciplinary environmental education program, sponsored by DES, which utilizes water as its theme. In New Hampshire, the program focuses on providing formal and non-formal K-12 educators with water education training and materials that can be used to promote awareness, appreciation, knowledge, and stewardship of water resources with youth. See www.des.nh.gov/ws.htm or call (603) 271-4071 for more information.

- *Make water conservation specialists available for public speaking engagements* - Speakers with conservation expertise can be made available to speak with organizations, communities, and associations.
- *Coordinate with local plumbing and water fixture suppliers and plumbers* - Joint advertising with local hardware, garden, and plumbing supply stores can be implemented to promote water saving fixtures and efficient landscaping practices.
- *Offer water conservation kits* - Offer water efficiency and water saving kits that include low flow faucet aerators and showerheads, toilet bladders, lawn care instructions with rain gauges, and leak detection tablets.
- *Offer water audits to customers* - Offer water audits of homes or institutions that include assessment of water use practices, water fixture retrofitting opportunities, and an internal water system leak detection and repair program. See fact sheets [Performing a Domestic Water Use and Conservation Audit](#) and [Performing a Business or Industry Water Use and Conservation Audit](#), for directions on performing water audits.
- *Establish demonstration projects and research* - Develop independent water conservation research and demonstration projects that show the feasibility of water conservation. For example, sponsor a public garden that uses water wise landscaping techniques. See fact sheet [Fundamentals of Xeriscaping and Water Wise Landscaping](#).
- *Promote water reuse* - Promote wastewater reclamation and/or reuse. Be sure to apprise customers of local, state and federal regulations regarding wastewater reclamation and reuse.
- *Outdoor water use restrictions* - During the summer months, outdoor water use accounts for a large percentage of the water system's peak demand. Lawn irrigation is a significant outdoor use, so reducing the amount of water used for irrigation is essential for protecting water supplies. Water use can be reduced if a utility works with its customers to reduce excessive outdoor use. See fact sheet [Water Efficiency Practices for Outdoor Water Use](#).

A utility may implement the following to reduce outdoor water use:

- Coordinate with local communities to develop ordinances that limit outdoor water use by customers.
- Develop programs that educate homeowners on how to properly grow and maintain lawns and gardens utilizing water efficient practices.
- Promote water efficient landscapes.
- Implement water conservation rate structures as discussed in Section 4 below.
- Separate metering of outdoor uses.
- Implement irrigation use restrictions, such as odd/even day watering.
- Urge the adoption of local ordinances banning the installation of automatic sprinkler irrigation systems on new construction. Other options are requirements that all in ground irrigation systems be equipped with rain shut off devices, moisture sensors, and automatic timers, or ordinances limiting the area that can be devoted to lawn.

Water Fixture Retrofitting And Replacement

A water utility can reduce the demand for water by assisting its residential and commercial customers with the installation of add-on devices or new water fixtures that use water more efficiently while at the same time meeting the needs of the customer. Examples of these types of devices include water saving toilets, drip irrigation systems, and low-flow faucets and showerheads. The advantage of the water saving devices is that the savings that are achieved, last forever. The devices do have an initial capital cost and require customer participation. Develop customer incentives to install water saving fixtures through programs such as the following:

- Rebates or billing credits to water users that purchase and install water saving devices.
- Monthly service charges to customers who do not provide proof of utilizing water efficient fixtures.
- Installation of retrofitting devices by representatives of the utility at a reduced cost or free of charge in conjunction with a water auditing program.
- Coordination with local communities to develop ordinances that limit outdoor water use by customers, and to require all new construction projects to utilize water efficient fixtures. Encourage local building inspectors to rigorously enforce existing plumbing and building codes.

System Metering And Improvements

Complete system metering lets customers know how much water they are using, provides the supplier with valuable knowledge of customer use patterns, assists in demand management programs, and enables the supplier to bill the customer accurately. Sub metering is also recommended in non-residential applications like industrial and some commercial facilities. With accurate knowledge about current demand, the supplier can more effectively identify potential water savings, assist specific users to implement water saving measures, provide the opportunity to reduce overall system demand, and plan efficiently for system growth.

A metered water system tracks the volume of water used and the volume of water that is "lost" in the system. When a utility has a significant unaccounted for water problem, it can become its own biggest customer. Therefore, an effective metering and leak detection program should be able to account for 90 percent of total production. Utilities should set the right example in leak detection if they want their customers to follow.

Water Conservation Incentives Through Rate Structuring

More and more utilities are using price as a demand management tool. According to a 1992 AWWA survey, approximately 60% of the utilities in the United States use a conservation rate structure. There are four different types of rate structures that can generally be classified as conservation oriented. These rate structures are classified as:

- **Uniform commodity rates** - This is a rate structure whereby all usage is charged at the same unit rate (see Figure 1). Although not often viewed as being a water efficiency oriented rate, uniform rates are an improvement over declining-block rate structures in which the price of water decreases as the volume of water used increases.
- **Flat seasonal rates** - This rate structure incorporates two or more different uniform volume charges for different seasons during the year (see Figure 2). Generally, a higher rate is charged to usage during the peak water usage season than is charged during the off-peak season.
- **Inverted block rates** - An inverted-block rate structure involves the use of increasing rates for units of water consumption at higher levels of usage (see Figure 3).

- **Excess use rates** - An excess use rate structure involves the establishing an average base water usage volume during the non-peak period, which is calculated separately for each customer. This base water usage is then charged at a base rate. During the peak period or season, water usage above this base level is charged at the base rate plus an excess use rate (see Figure 4). Several variations of the excess use rate structure exist. Some utilities provide an allowance above the base usage during the peak season to recognize an increase in non-discretionary use during peak periods.

Figure 1: Flat Rate Structure

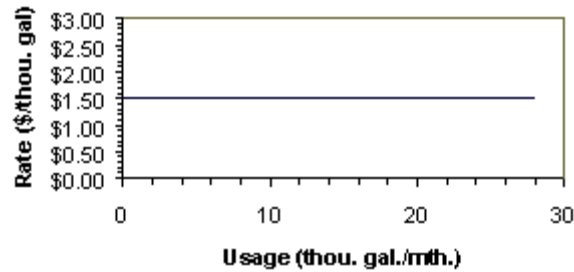


Figure 2: Flat Seasonal Rate Structure

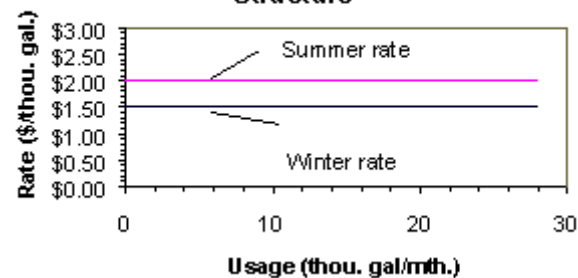


Figure 3: Inverted Block Rate Structure

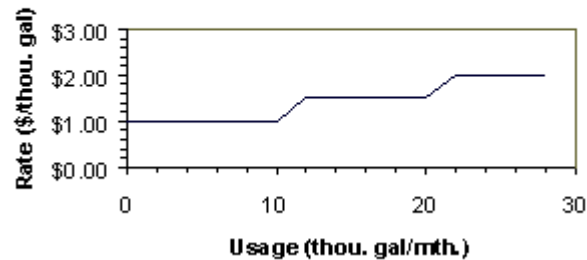
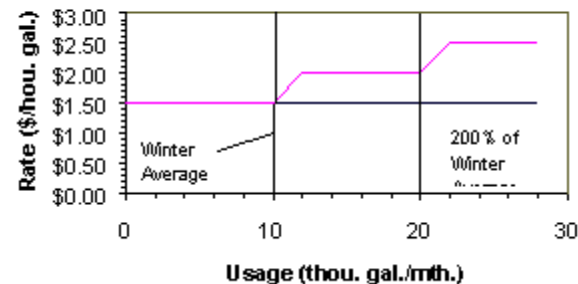


Figure 4: Excess Use Rate Structure



Which Rate Structure Is Right For A Utility?

Each utility will be presented with a unique set of circumstances that it must assess prior to implementing a conservation rate structure. In general, the criteria that may be helpful in evaluating the effectiveness of a specific type of water efficiency oriented rate structure include:

- Which rate structure produces a measurable reduction in water usage?
- Which rate structure increases the awareness of resource availability by its customers?
- Which rate structure allows the utility to stabilize and predict revenue?
- What is the general public acceptance of the rate structure?
- What is the perceived equitability of the rate structure?
- What is the administrative efficiency of the proposed rate structure?

The appropriateness of a given conservation rate structure is dependent in part upon the circumstances of the particular utility. Each rate structure has advantages and disadvantages. The type of rate structure currently in place can also have an influence on the response to a conservation oriented rate structure. For example, an immediate change from a declining block rate structure to an inclining block rate structure would likely result in large increases in cost to large quantity water users, but could result in lower rates to small quantity water users (which collectively are the largest user group of water) inducing the group of small quantity water users to use more water.

Similarly, the type of customer base served by a utility is important to consider when implementing a conservation rate structure. For example, an inverted-block rate structure may provide a considerable incentive for large water users to reduce their usage requirements without charging high water rates to water users with low monthly usage levels. However, in some instances, those large water users may be industrial facilities with limited options to implement substantial water conservation measures, and yet they would be paying higher water rates under the inverted rate structure. A utility should research and work with its customer base to determine the best method for achieving its water conservation goals.

Importance of Billing Frequencies.

The billing frequency of the water utility is an important factor in the implementation of water efficiency oriented rates. Lengthy billing periods can be a limiting factor. The more frequent the billing, the more likely conservation rates will be successful.

How Does a Utility Project Future Revenue?

Although uncertainty in revenue is not unique to any utility rate structure, it is greater when implementing conservation rate structures, as these pricing policies usually do not exhibit the high minimum charge that standard rate structures incorporate. A utility must assess the interrelationships between rates, consumption, and costs, and how these issues affect the revenue requirements of the utility. A utility should study its billing records and survey its primary customers to better understand the potential revenue impacts from a proposed pricing structure.

Include the Protection of Future Water Resources in the Application of Any Water Rate Structure.

A reduction in overall water use may cause a water system to defer purchasing the rights to, or securing land to protect new water resource areas. With the passage of time these nearby, relatively low cost water resource sites could be developed for other purposes and lost forever. Any new rate structure should be designed to provide the revenue to enable the utility to purchase and protect future sources of water for the system.

Coordination With Local Elected Officials To Develop Ordinances Relating To Outdoor Landscape Construction And Water Use Restrictions.

To combat excessive outdoors water use, local municipalities have begun instituting ordinances banning new installation of in-ground irrigation systems. Others place severe restrictions on their use. The water utility can encourage local officials to adopt such ordinances, citing the sizeable water and cost savings that can be achieved by this type of legislation.

For Additional Information

Should you have any questions about implementing a water conservation program, contact the Water Supply Engineering Bureau at (603) 271-0660. Reference documents are available from the Department to assist with the implementation of water conservation programs.

WaterWiser, a program of the American Water Works Association
www.waterwiser.org/

North Carolina Division of Pollution Prevention and Environmental Assistance.
www.p2pays.org/

Massachusetts Water Resources Authority - Conservation Issues
<http://www.mwra.com/04water/html/wat.htm>

EPA's Water Efficiency Program
<http://www.epa.gov/owmitnet/water-efficiency/index.htm>